



SITE SPECIFIC HEALTH & SAFETY PLAN

**29 Riverside Ave.
Newark, NJ**

December 11, 1999

Prepared for:
**United States Environmental Protection Agency
Region II
2890 Woodbridge Avenue, Building 209
Edison, NJ**

Prepared by:
**WRS Infrastructure & Environment, Inc.
346 S. Warminster Road
Hatboro, PA 19040**

Approvals:

**Richard McCarroll
WRS Response Manager**

**Doug Nelson, CIH, CHMM
WRS Corporate Health & Safety Officer**

EPA On Scene Coordinator

START



A. SITE DESCRIPTION

Hazards: Containers of hazardous materials.

Surrounding: Passaic River, Urban, Commercial

Weather : Temperature ranges between 10° and 45°.

Additional: none.

B. SCOPE OF WORK

- I.) Set up temporary command post.
- II.) Open drums, collect samples and close drums.
- III.) Decontaminate equipment.
- IV.) Demobilize



C. ON-SITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.)

- | | | |
|---------------------------------|-------------------------|---|
| 1. Point of Contact | Doug Henne | (215) 796-0335 |
| 2. Response Manager | Rich McCarroll | (708) 267-6625 cellular
(888) 754-1389 Pager |
| 3. Site Health & Safety Officer | Rich McCarroll | (708) 267-6625 cellular
(888) 754-1389 Pager |
| 4. WRS Field Team Members | <hr/> <hr/> <hr/> <hr/> | |
| 5. Subcontractors | <hr/> <hr/> <hr/> <hr/> | |
| 6. EPA On Scene Coordinator | <hr/> <hr/> | |
| 7. START Representatives | <hr/> <hr/> | |

All personnel arriving or departing the site must log in and out with the Response Manager or his/her designated representative. All activities on site must be cleared through the Response Manager.

D. ON-SITE CONTROL

1. Rich McCarroll has been designated to coordinate access control and security on site. A safe perimeter has been established at the Command Post. Unauthorized personnel are not allowed beyond this area.
2. The on-site Command and Control Center has been established at the front of the site inside the temporary trailer.
3. The prevailing wind conditions are to be determined
The location of the Command Post is upwind from the Exclusion Zone.



4. Control boundaries have been established, and the Exclusion Zone, Contamination Reduction Zone, and Support Zone have been identified and designated as follows:

Exclusion zone(s): 50 ft. perimeter around area where drums are staged and where drum sampling will take place.

Decontamination zone(s): adjacent to each exclusion zone.

Support zone: all other areas on the site.

The work zones will be identified by: high visibility caution tape (to prevent unprotected personnel from entering).

E. HAZARD EVALUATION

The following substance(s) are known or suspected to be on site. The primary hazard of each substance is identified.

Anticipated Substance(s) Involved

	Concentration (If Known)	Primary Hazards	Primary Control
Trimethylcyclohexanol	up to 100%	Liquid, Combustible, Skin and eye irritant	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers
Trimethylcyclohexylamine	up to 100%	No Information Found	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers
Trimethylhexandiol	up to 100%	No Information Found	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers
Chlorinated Benzolid Xylid	up to 100%	No Information Found	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers
Trimethylcyclohexane	up to 100%	No Information Found	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers
Para sulpho phenol methyl parazone	up to 100%	No Information Found	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers
Rhoplex B-10 (a.k.a. polymethylmethacrylate)	up to 100%	Combustible liquid	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers



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	Concentration (If Known)	Primary Hazards	Primary Control
Morpholine	up to 100%	Flammable liquid, Corrosive irritant to skin/ eyes, PEL 20 ppm	Avoid skin contact and inhalation of vapors, avoid combination with oxidizers. Avoid ignition sources
Calcium gluconate	up to 100%	Solid, combustible	Avoid skin contact and inhalation of dust, avoid combination with oxidizers. Avoid ignition sources
Hydrofluoric Acid	up to 100%	Corrosive, to skin, incompatible with glass, and combustibles	Avoid skin contact, Avoid contact between HF and glass and organic materials, see attached first aid measures, Avoid getting water into containers of HF



F. PERSONAL PROTECTIVE EQUIPMENT

Based upon evaluation of the potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

Location	Task	Initial Level of Protection
Exclusion zone:	All drum handling and sampling Activities	B
Contamination reduction zone	personnel & equipment decontamination.....	D+
Support zone	project management, material storage, support activities.....	D

Specific protective equipment for each level of protection is as follows:

Level A: use is not anticipated

Level B:

- full face, pressure demand SAR w/ escape SCBA or SCBA
- Two piece, PVC rain suit or Saranex over Tyvek (**DOUBLE COVERALL**)
- chemical resistant boot covers (PVC)
- steel toe boots
- inner PVC or latex gloves
- outer nitrile, neoprene or PVC gloves
- hard hat

Level C:

- full face APR with GMC-P100 cartridges
- Two piece PVC rain suit, Saranex or Tyvek suit
- chemical resistant boot covers (PVC)
- steel toe boots
- inner PVC or latex gloves
- outer nitrile, neoprene or PVC gloves
- hard hat

Level D+:

- hard hat
- safety glasses
- chemical resistant boot covers
- steel toe boots
- inner PVC or latex gloves
- outer nitrile, neoprene or PVC gloves
- Two piece PVC rain suit or Tyvek



Level D:

- hard hat
- safety glasses
- steel toe boots

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER AND THE RESPONSE MANAGER.

G. COMMUNICATION EQUIPMENT & PROCEDURES

The support zone will be equipped with a cellular telephone, and an air horn.

One long blast (air horn) is the emergency signal to indicate that all personnel should leave the Exclusion Zone. Repeated short blasts will be the signal for man down and summons for assistance.

The following standard hand signals will be used in case of failure of radio communications:

Signal	Meaning
Hand gripping throat.....	Out of air, can't breathe
Grip partner's wrist or both hands around waist.....	Leave area immediately
Hands on top of head.....	Need assistance
Thumbs up.....	OK; I'm all right, I understand
Thumbs down.....	No, negative

H. DECONTAMINATION PROCEDURES

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard level D+ decontamination protocol shall be used with the following decontamination stations:

- Boot wash/rinse
- Outer glove wash/rinse
- Outer coverall wash/ rinse*
- Remove outer coveralls and hang for drying
- Remove outer gloves and hang for drying
- Rinse hard hat (inside and out)
- Remove inner gloves

*Dispose when coverall can no longer be decontaminated.

The following decontamination equipment is required:

1. Trash can with liner
2. Washtubs (2)



3. Liquid soap
4. Buckets (3)
5. Long handled brushes (2)
6. Garden sprayer

I. SITE SAFETY AND HEALTH PLAN

1. Designated Site Safety Officer

Rich McCarroll has been designated the Site Safety Officer and is responsible for monitoring site activities for unsafe acts and unsafe conditions as well as monitoring for compliance with this Plan.

2. First-aid equipment

First-aid kit: Command post, and WRS Truck.

Fire extinguisher: Command post, exclusion zone entrance(s), and WRS pick-up trucks.

Eye wash/emergency shower: Exclusion zone entrance(s).

3. Atmospheric Monitoring

The following atmospheric monitoring instruments shall be used on site at the minimum specified intervals:

Combustible Gas Indicator (%LEL/%O₂): initiation of task/continuous/hourly/daily/ drum opening events

Photoionization Detector (PID): initiation of task/continuous/hourly/daily/ drum opening events

See also requirements of attached Standard Operating Procedures.



I. SITE SAFETY AND HEALTH PLAN (Continued)

4. Emergency Procedures

The following standard emergency procedures shall be read and understood by all personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone:

Upon notification of an injury in the Exclusion Zone, the designated emergency signal: One long blast shall be sounded. All site personnel shall assemble at the decontamination line. The Response Manager and Site Safety Officer shall evaluate the nature of the emergency and determine appropriate action. Decontamination will be based upon the nature of the injury and the condition of the injured person.

Personnel Injury in the Support Zone:

Upon notification of an injury in the Support Zone, the Response Manager and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the Site Safety Officer initiating the appropriate first-aid procedures. If the injury increases the risk to others, the designated emergency signal: One long blast shall be sounded and all site personnel shall move to the decontamination line for further instruction. All activities on site will stop until the added risk is removed or minimized.

Repeated short blasts will be the signal indicating an individual has fallen into the water as well as a call for assistance.

Fire/Explosion:

Upon notification of a fire or explosion on site, the designated emergency signal: One long blast shall be sounded and all site personnel shall assemble at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure:

If any site worker experiences a failure of protective equipment that affects protection afforded by the user, that person and his/her buddy shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.



4. Emergency Procedures (Continued)

Other Equipment Failure:

If any other equipment on site fails to operate properly, the Site Manager and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the work plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions are taken.

Emergency Escape Routes:

The following emergency escape routes are designated for use in those situations where egress from the Exclusion Zone cannot occur through the decontamination line:

Shortest upwind route off the site

5. Personal Monitoring:

The following personal monitoring will be in effect on site:

HNU measurements in breathing zones

%LEL measurements in work areas and when opening containers

See also requirements of attached Standard Operating Procedures.

6. Site Specific Medical Monitoring:

No Site Specific Medical Monitoring is planned.



J. CONTINGENCY PLAN

1. Local Sources of Assistance:

Hospital Name: Columbus Hospital
Address: 495 North 13th St.
Newark, NJ 07107
Phone: (973) 268-1400

Ambulance: 911

Fire Dept: 911

Local Police: 911

Sheriff: 911

State Police: 911

2. National and Regional Sources of Assistance:

Corporate Health & Safety Office (404) 299-1998
(678) 296-1267 mobile
EPA Region II Hotline (732) 548-8730
Chemtrec (24-Hours) (800) 424-9300
Bureau of Explosives (24-Hours) (202) 293-4048
National Response Center (NRC) (800) 424-8802
(Oil /Hazardous Substances)
DOT(Office of Haz. Operations) (202) 246-0656
Medical Services Network (800) 874-4676



K. PLAN SIGN-OFF

All site personnel have read this plan and are familiar with its provisions.

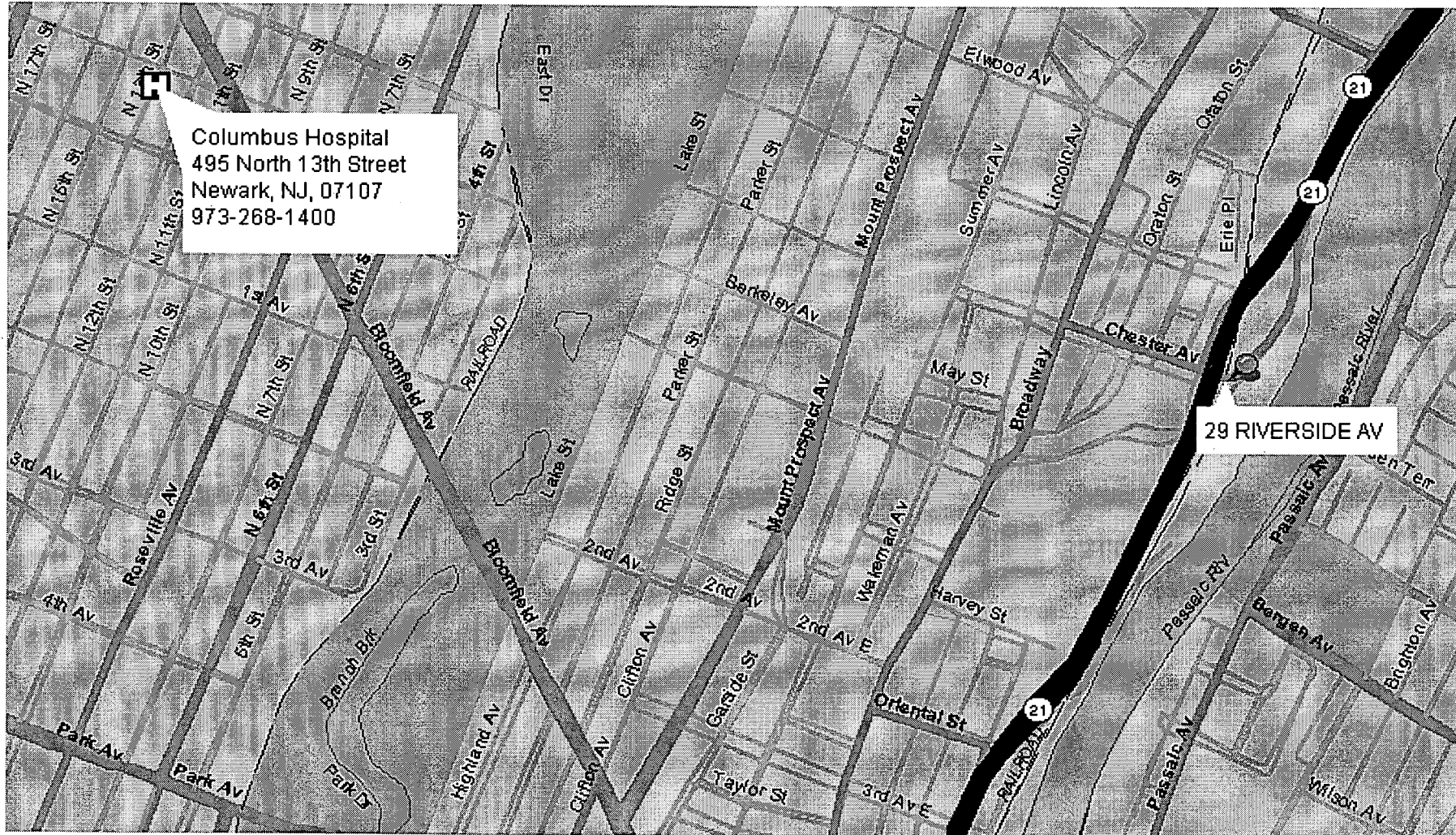
Site Safety Officer Rich McCarroll _____

Response Manager Rich McCarroll _____

Other Site
Personnel _____



Route to Hospital



FIRST AID PROCEDURE FOR RESPONDING TO HYDROFLUORIC ACID BURNS

Introduction

Hydrofluoric acid is an extremely hazardous liquid. It can cause severe skin and eye irritation or deep-seated, slow-to-heal burns. In certain cases, exposure can prove fatal. For any major exposure to HF, immediate paramedic assistance is necessary.

HF's mode of action is to bind calcium whenever contact occurs with skin or other body tissues. Unlike the action of other acids, which are rapidly neutralized, tissue destruction and neutralization of HF may proceed for days. Because calcium is necessary for cell life, its binding can bring about rapid cell death. If the exposure is extensive, excessive amounts of calcium may be inactivated and inadequate supplies of calcium may be available for vital bodily functions.

Inform the physician treating the HF injury the nature of the chemical involved in the exposure and deliver a Material Safety Data Sheet (MSDS). Some medical providers may not commonly encounter HF. Offer as much information as possible regarding the chemical and its effects. Encourage the physician to consult an occupational specialist for further information, if needed.

Skin Contact

Skin contact with hydrofluoric acid may cause severe burns. At concentrations of less than 50% hydrofluoric acid, the burns may not manifest immediately. Fluoride ions penetrate the skin easily and, thus, the burns may be deep and can cause considerable damage. Use and application of the antidote gel should not be based on the visible observation of burns but on the knowledge of dermal contact. Be cognizant that exposure may occur under fingernails, where antidote application is especially challenging. Therefore, medical care is absolutely essential.

1. Remove the victim to a safe location. Use protective equipment when handling a contaminated victim.
2. Immediately flush the exposed skin with water for a maximum of 5 minutes. Flush well but briefly. It is critical to apply antidote as soon as possible.
3. Remove contaminated clothing during washing. Cut away clothing, if necessary, to avoid injuring affected skin.
4. While someone is assisting the patient with rinsing of the exposed skin, another employee shall contact local emergency medical assistance. Paramedics will be necessary for hospital transport.
5. After adequate 5-minute rinsing, apply calcium gluconate gel to the skin gently and freely. Aggressively massage the gel into the affected part (wearing gloves) and continue to reapply and



massage until pain is entirely relieved. If medical assistance is delayed, apply gel every 15 minutes until pain and/or redness disappear or until the emergency rescue team arrives. If the exposure is to a hand, the gel may be placed in a latex glove and the glove placed over the hand to maintain beneficial contact with the affected area. Use as many tubes of calcium gluconate gel as required by the directions but throw away all tubes that have been opened during first aid treatment of the injury. Opened tubes should not be saved for later reuse. Fresh tubes are sealed for sterility protection. Following an incident involving use of the gel, ensure that the supply of gel remains adequate. Replace the gel when the expiration date is exceeded.

6. All hydrofluoric acid burns are to be evaluated by a physician, usually in the emergency room setting. This includes burns to a very small area of the skin and those treated with gel. Further reapplication of antidote gel or other medical procedures may be necessary at the emergency room in order to prevent reversion of the acid burn.

Eye contact

Hydrofluoric acid can cause severe eye burns, with destruction or opacification of the cornea. Blindness may result from severe or untreated exposures. Immediate first aid is necessary.

1. Immediately flush eye(s) for at least 5 minutes.
2. Irrigate the eye repeatedly with 500-1000 ml of a 1% calcium gluconate solution applied through a syringe.
3. Call for prompt emergency room transport. Apply ice-water compresses during transport.
4. Send the patient to an eye specialist as soon as possible.

Inhalation

Concentrated solutions and anhydrous hydrofluoric acid produce pungent fumes on contact with air. These fumes can cause nasal congestion and bronchitis, even in low concentrations. Burns that occur when the vapors or liquid contact the oral mucosa or upper airway may cause severe swelling, to the point of airway obstruction.

1. Immediately move the victim to fresh air and seek medical attention. Trained medical responders will be necessary to administer oxygen and nebulized calcium gluconate.
2. Keep the victim warm, quiet, and relatively comfortable.
3. If breathing has stopped, start artificial respiration at once.



CALCIUM GLUCONATE GEL AS AN ANTIDOTE TO HYDROFLUORIC ACID BURNS ON SKIN

1. Calcium Gluconate 2.5% Topical Gel can be purchased from Pharmascience Inc., 175 Rano St., Buffalo, NY, phone 1-800-207-4477. The cost per tube is \$27.55 but a minimum order of 6 tubes is required. A reduced price of \$22.05 per tube is attached to purchases of 12 or more tubes. Pharmascience will add a 5% shipping and handling fee.

Cameron Medical, 9430 Burtis Street, South Oak, CA, 90280, phone 1-800-777-3723, Item #751500. The price is currently \$33.11 per tube. This does not include the cost for delivery.

This gel is available without a prescription. Gel is packaged in 25-gram tubes. Prices are current for April 1999.

2. If the commercial gel product is not available, an emergency in-house version can be prepared for treatment of hydrofluoric acid burns on skin. This homemade gel is composed of 3.5 grams of calcium gluconate powder mixed into 5 ounces of water-soluble lubricant such as K-Y Jelly or Surgilube. Pre-made stock should be kept on-hand whenever HF is to be used. There is little time for deliberation and searching for the tubes. HF users may want to run practice drills for possible HF incidents to guarantee that they can follow appropriate procedures quickly and automatically.

3. A local pharmacy may also be available to prepare antidote gel. The pharmacist may choose to substitute magnesium for calcium.

NOTE: The major action of either of these two gels, commercial or homemade, is to provide excess (or substitute) calcium stores so that bone tissue does not act as the calcium supply. The calcium from the gel will function as a fluoride scavenger to generate calcium fluoride, a product that may be excreted from the body. Removal of calcium from blood and tissue by fluoride ion attack results in a serious, frequently life-threatening condition known as hypocalcemia.

All HF burns require a medical evaluation, whether treated with gel or not.

REFERENCES

Segal, Eileen B, "First Aid for a Unique Acid: HF," Chemical Health and Safety, September/October 1998, Vol. 5, No. 5, p.25.

Bronstein, A. C. and Currance, P. L. "Emergency Care for Hazardous Materials Exposures." Mosby Company, 1988.



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EQUIPMENT

1.0 PURPOSE

The Drum Handling SOP identifies the hazards and hazard control measures associated with drum:

- excavation;
- opening;
- sampling;
- moving; and,
- storing.

2.0 SCOPE

This SOP applies to all drum handling activities undertaken by WRS personnel and its subcontractors. The SOP also applies to any other container which exhibits a hazardous characteristic which can be diminished by the hazard control measures described in this SOP (e.g. vats, containers, tanks, etc.).

3.0 PROCEDURES

3.1 HAZARD RECOGNITION

Chemical

Chemical hazard classes associated with drum handling can include toxic, corrosive, flammable, and/ or reactive. The degree of hazard posed by drums is typically higher than other environmental media contamination (i.e. contaminated soil & water) due to the confining nature of a drum and higher concentrations of contaminants found in drums (sometimes up to 100%). Accident types associated with drum chemical hazards include:

- exposure by inhalation to gases and/ or vapors;
- exposure by skin contact to corrosives and compounds absorbed through the skin; and,
- fire/ explosion.

Clues to the hazards contained within a drum can be derived from drum configuration and material of construction. Drums configured with:

- removable heads were manufactured to contain solids; and,
- non-removable head drums were manufactured to contain liquids.

Containers with rounded ends were manufactured to contain pressurized materials (i.e. gases)

Drums constructed of :

- carbon steel are typically painted and used to contain non-corrosive liquids (flammable and/or toxic);
- stainless steel or Monel (a nickel alloy) are typically used to contain corrosive liquids (nitric acid);
- plastic are typically used to contain dilute concentrations of corrosive liquids (muratic acid); and,

- cardboard are typically used to contain solids (lime)

Of course the drum may not contain a material for which it was manufactured.

The condition of the drum can provide clues as to the hazard contained within. Bulging drums may:

- currently contain frozen liquids or have contained frozen liquids in the past (indicating an aqueous material);
- currently or in the past been under pressure due to vapors from liquids with high vapor pressures (e.g. flammable liquids);
- currently or in the past been under pressure due to gases from incompatible reactions (e.g. acids mixed with organics or bases)

Physical

Physical hazards posed by drum handling activities are associated with physical attributes of drums including: pressurized contents, weight, and sharp metal edges. Accident types associated with drum related activities can include:

- Struck by & contacted by pressurized releases of drum contents;
- Struck by drum parts (removable heads, rings and bungs) thrown by pressurized releases of drum contents;
- Struck by falling drums;
- Contact with sharp metal parts (chimes, rings, etc.);
- Strain/ Overexertion due to inappropriate lifting techniques and/ or attempting to stop a falling drum; and,
- Caught between drums when loading damaged drums into salvage or overpack drums and when manually moving drums next to one another.

3.2 ACTIVITY SPECIFIC PROCEDURES

Unknown Drum & Anomaly Excavation

Prior to excavation activities, a ground penetrating radar system or other type of detection system will be used to estimate the depth and location of buried drums. Overburden will be removed so as not to damage a drum. All unknown drum and anomaly excavations will be performed in Level B PPE.

Opening Unknown Drums

If the contents of the drums or containers are unknown, Level B protection, as a minimum, will be worn. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents have been identified. If the contents of the drums or containers are known, specific personnel protective equipment will be worn in accordance with the Health and Safety Plan.

The following procedures shall be used when opening drums with unknown contents:

- Before and during drum opening activities, monitoring will be done by means of a PID or FID and combustible gas indicator. Operations will be suspended and the SHSO contacted if the 20% of the LEL is reached. If the contents of a drum are known, the Safety Officer will determine action levels for suspension of activities in accordance with the Health and Safety Plan.
- If an airline system is used, this system shall be protected from contamination and physical damage.
- Only those employees essential to drum opening operations will be in the drum opening area.
- Bulging drums will be placed behind a barrier, or "bomb shield," and opened by means of a remote, automatic drum opener. The worker opening the drums will work behind a separate barrier.
- All non-bulging, non-removable head drums with bungs will be opened slowly to release potential gases and vapors. Rapid removal of a bung on a pressurized drum can result in the opener being splashed by the drums contents or being struck by the bung. The smaller of the two bungs will be opened first because of the higher thread count. If a release of pressure is detected (by sound) once the bung is loosened, step back and wait for drum to vent. Once the drum has vented, remove the bung and proceed. Do not remove the bung all at one time.
- If the bung on a non bulging drum cannot be removed, the drum shall be moved to a segregated area and opened by means of a drum punch.
- All equipment and tools used to open drums will be of the type which is incapable of acting as an ignition source.
- All fire control equipment shall be kept behind the barriers discussed above.
- Employees shall not stand on or work from drums or containers and will not stand over or place hands and arms over a drum.

Transferring Drum Content

When a drum is deemed to be unfit for moving, its contents must be transferred to another container. Drums with unknown content will be assumed to contain hazardous materials and the following precautions will be taken:

- pumps will be air driven double diaphragm, explosion proof or intrinsically safe electric with chemically inert internal parts (e.g. viton, teflon, rubber, neoprene, etc.); and,
- discharge end of the pumping system will be manned to prevent discharge of the drum's contents onto the ground.

All drums containing waste that is to be transported off site for disposal will conform with all DOT regulations including the United Nation's performance oriented package specifications.

Stacking Drums

Maximum height

As with any container, drums have a maximum stacking height which is based on their ability to withstand the weight placed upon them by stacking. Only drums stacked to near perfect vertical, perform to the maximum stacking height. Overstacked and leaning drum stacks cause pallet failure and container failure. Wet, fiber drums are particularly vulnerable to overstacking. Without knowledge of a container's particular stacking height limitations, limit stacking to two drums high.

Palletizing

A palletized drum is easier to move and also can slow corrosion of carbon steel drums which would otherwise be in contact with wet soils. Palletize drums prior to filling to facilitate handling. Palletize and band all drums prior to stacking. Products are available which serve as both a pallet and as secondary containment. Do not use damaged pallets.

Transporting Empty Drums

For purposes of transportation, a drum is considered empty when it has been cleaned, purged of vapors, and no longer exhibits the hazard characteristic(s) it once contained. (i.e. flammable atmosphere due to flammable liquid residues.) Intact, empty drums which cannot be cleaned will be labeled, marked and manifested as if it were a full drum. If drum cleaning is not desirable, the drum may be crushed and placed in another DOT approved shipping container.

Non-intact drums that meet the definition of RCRA Empty drums will be typically crushed, placed in roll-offs and transported off-site as non regulated waste. Non-intact drums, which do not meet the RCRA Empty definition and have not been cleaned of RCRA/ TSCA/ CERCLA wastes are typically crushed, placed in roll-offs and manifested as a bulk load of hazardous debris.

Drum Staging Operations

Drum staging for segregation of hazard classes, providing secondary containment and preparation for transportation and disposal is a common practice on remediation sites.

When excavating unknown drums the following areas are to be set up on the site:

- excavation area;
- drum sampling cue area (drums in cue should not exceed a quantity that can be sampled by end of the day);
- drum sampling area; and,
- post sampling staging.

When drums with unknown content are to be handled but they are not buried, the following areas will be set up on site:

- drum sampling cue area (drums in cue should not exceed a quantity that can be sampled by end of the day);
- drum sampling area; and,
- post sampling staging area.

Staging areas are to be arranged as follows:

- drums may be placed in rows no more than two drums deep;
- aisle ways between rows of drums will be of sufficient width to allow uninterrupted egress and movement of drum handling equipment;
- do not place leaking drums in the staging area with other drums, instead, segregate the leaking drum so that it does not impact intact drums; and,
- labels on drums must face into the aisle way.

Individual drums to be sampled will be segregated from all other site activities during sampling. Once sampling is complete, the drum may be staged with drums which have already been sampled.

Moving/ Lifting Drums

Site operations will be designed so that container movement is minimized. Drums which cannot be moved without rupture, leakage or spillage will be emptied into a second container.

Drum lifting devices and their uses include:

Type	Pros	Cons
single sling	good for moving drum from one location to another	not to be used for overpacking
double sling	good for overpacking	if drum is out of round, may be difficult to remove slings
hydraulic grappler (trac hoe mounted)	good for moving drums which are already damaged	typically damages drums, awkward for overpacking
mechanical: chime gripping/ lift activated ("hooks")		chimes which are bent or corroded may fail and allow the device to drop the drum
mechanical: chime gripping, cam locking	can handle drums which are minimally out of round	
mechanical: rib gripping, lift activated, forklift mounted		drums which are bent or corroded may fail and allow the device to drop the drum

Lifting devices are rated for the weights they can lift and some specify that they may or may not be used for removable and non-removable head drums. Lifting devices used, must be rated to handle the anticipated lift.

To avoid being struck by a drum as it is lifted, position the lifting device around the drum, step back from the drum and signal the operator to make the lift. As with any lifted load, do not get close enough to the lifted drum to put your hands on it.

Placing Drums in Overpacks and/ or Salvage Drums

Drums to be overpacked must be placed in an overpack so that the top of the inner drum is in the up position prior to shipping to a TSD. Placing drums into overpacks/ salvage drums poses the following hazards:

- ground crew members can be struck by drums which swing as they are lifted with slings;
- ground crew members can be struck by drums that fall from the sling or other lifting device;
- hands and fingers are at risk of injury by pinch points as ground crew members attempt to place a drum into an overpack with a single sling.

To avoid pinch points, do not place hands/ fingers in the overpack while inserting the drum. To avoid being struck by a drum as it is lifted with a sling, position the sling around the drum, signal the operator to take the slack out of the sling, step back from the drum and signal the operator to complete the lift. As with any lifted load, do not get close enough to the lifted drum to put your hands on it.

Overpacks vs. Salvage Drums

There are differences between overpacks and salvage drums. The overpack regulations can be found in 49 CFR 173.25, and the salvage drum regulations can be found in 49 CFR 173.3(c).

Overpacks are used by a shipper in order to provide protection or convenience in handling a package or to consolidate two or more packages. Containers of hazardous materials within an overpack must not be damaged and must meet the DOT's performance oriented packaging standards. Overpacks must be marked with the proper shipping name and identification number (UN or NA number), and labeled for each hazardous material inside the overpack. The containers inside the overpack must be UN approved, secured and cushioned to prevent breakage. There should also be absorbent inside the overpack in case there is breakage. The overpack can not be filled with a quantity that is greater than what is marked on the overpack. If there are liquids inside the overpack, the container must be placed with the closure upright and there must be orientation arrows on the outside of the overpack. The overpack must be marked with the statement "INNER PACKAGES COMPLY WITH PRESCRIBED SPECIFICATIONS". Labels with the previous statement printed on them can be purchased from companies such as Labelmaster or JJ Keller. Class 8 (corrosive) packing group I or Division 5.1 (oxidizers) packing group I can NOT be overpacked with any other material. The inner package(s) must also be labelled and marked.

Salvage drums are used when a package or packages of hazardous materials are damaged, defective, or leaking. The salvage drums may be metal or plastic with removable heads. The salvage drums must be UN approved and must be compatible with the material inside the damaged drum. There must be sufficient cushioning to prevent excessive movement of the damaged container and sufficient absorbent material to eliminate the presence of free liquids at the time of drum closure. The cushioning and absorbent must be compatible with the hazardous material. The salvage drum must be marked with the proper shipping name, the address of the generator, and the words

"SALVAGE DRUM". The salvage drum must also be labeled for the material inside the damaged drum. The inner package must be labelled and marked.

Waste Stream Bulking Operations

Drum contents will be bulked together only after they have been characterized and lab scale compatibility testing has been completed. Level B PPE will be used by ground crew members during bulking operations.

Lab Packs

The phrase "lab pack" is used to describe a container which is loaded with a collection of smaller containers and sometimes an absorbent/ cushioning material such as vermiculite. The containers within the lab pack may or may not contain chemicals from a laboratory. Lab packs are assembled by generators of hazardous waste to make disposal of a large number of small containers cost effective. When assembled correctly lab packs contain chemicals which are compatible with each other and do not react with one another if broken and contents are released.

Hazards associated with the containers within a lab pack are the same chemical hazards associated with any chemical container (i.e., flammable, corrosive, toxic, reactive and various hazard combinations). The risk of encountering these hazards when opening small containers can be greater than when opening large containers for the following reasons:

- high hazard materials (e.g., shock sensitives, and water & air reactives tend to be stored in small containers); and,
- the close contact that occurs when using your hands to remove lids increases risk of exposure.

As a result the following special handling procedures apply to lab pack handling:

- remove all non-essential personnel to safe distance from handling operation;
- when possible use a grappler unit constructed for explosive containment for initial handling;
- maintain continuous communication with Site Safety Officer until handling operations are complete;
- once a lab pack has been opened, have a chemist or other qualified personnel (e.g. individual with university level chemical laboratory training) inspect, classify, and segregate the containers within it, without opening them, according to the hazards of the wastes;
- if crystalline material is noted at the neck of any bottle, handle it as a shock sensitivewaste, due to the potential presence of picric acid or other similar material and get expert advice before attempting to handle it
- other container signs of potentially high hazard material include: sheet metal cans with plastic screw on lids - potentially contain organic peroxides which can be shock sensitive; any container labelled as containing peroxides; glass containers which contain solids stored under liquid could contain air/ water reactives such as sodium; and,
- it is recommended that small containers that are complete unknowns due to lack of container markings/ labels not be opened for sampling.

Re-packing lab packs for disposal is to be done at the direction of the disposal facility(s).

4.0 REFERENCES

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

5.0 ATTACHMENTS

None

6.0 RECORDKEEPING

Drum Logs
HAZCAT results

7.0 EQUIPMENT

Specified within the SOP